

PD - AS - 1110  
April

**AGRICULTURAL SECTOR  
SUPPORT PROGRAM**

**AGRICULTURAL DATA  
COLLECTION COMPONENT**

**Quarterly Report  
October 1 - December 31, 1990**

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## 1. HIGHLIGHTS:

Stratification and digitization of topographical maps continued ahead of schedule, with more than half for the country finished by the end of the quarter. Objective yield (OY) field work, which started in late September, continued during this quarter for the four Kharif crops in the program -- rice, cotton, maize and sugarcane. Post-harvest plots, to determine farmer harvesting losses, were laid-out and harvested in rice fields for the first time. A 9 day trip was completed in the Lasbela and Turbat Districts of Balochistan Province to groundtruth SPOT satellite imagery. A 4 day groundtruthing trip was also made to the Rawalpindi and Chackwal Districts of the Punjab Province. The Agricultural Data Collection (ADC) Team Leader made several suggestions to the ADC Cell for improving OY survey results. The ADC Project office made some color slides in cotton and maize fields in the Punjab for possible use in OY enumerator training classes on these crops. The ADC Team Leader attended a Global Positioning (GPS) equipment demonstration in Peshawar to study its applicability to the ADC Project. The ADC Team Leader also invited Gary Archer, with the World Bank Resident Mission in Islamabad, to accompany him on a trip to the Punjab to observe OY field procedures. The purpose was to investigate the possibility of tying some of Mr. Archer's crop residual energy study to the ASF survey and, thus, avoid duplication of effort and expenditures.

## 2. FRAME CONSTRUCTION:

When this quarter ended, the ADC Cell had 239 of the 380 SPOT scenes required for the entire country in house. The remaining 141 SPOT scenes have been ordered and will continue to be re-ordered until all have been received. The ADC Cell requests that SUPARCO take the scenes during passes of the satellite during the Sept - Oct and Jan - March periods when desired crop growth is present -- and only when cloud cover is less than 10 percent.

Stratification and digitization of topographical maps continued at a good pace in the Balochistan, Punjab and Sindh provinces during the quarter. By the end of the quarter, the completion rate by province was: Balochistan, 69%, Punjab, 46% and Sindh, 48%. This represents 51% of the maps for the entire country (work had not yet started in the NWFP). A total of 185 maps were stratified and digitized during the quarter, exceeding the quota of 168 established on page 2 of the Sixth Year Work Plan.

Two trips were made during the quarter to groundtruth SPOT satellite imagery. A 9 day trip was made to the Lasbela and Turbat Districts of southern Balochistan Province and a 4 day trip was made to the Rawalpindi and Chackwal Districts of the Punjab Province. Copies of the Trip Reports written by the ADC Project office and the more detailed Trip Reports written by the ADC Cell are shown in Appendices 1 and 2.

The Director of the ADC Cell and the Chief of the Area Sampling Frame (ASF) Section, plus the ASF Statistical Officers responsible for the stratification planned the trips and stayed with the team during all days of the trip. The ADC Team Leader also accompanied the team through the entire trip. Three of the Statistical Officers from the ASF lab, that were responsible for the stratification work in the Lasbela and Turbat Districts, went on the trip.

On the trip to the Rawalpindi and Chackwal Districts, the 6 Statistical Officers and all of the Statistical Assistants that work in the stratification lab, were taken along.

Both of these trips paid big dividends, as is usually the case with groundtruthing. In southern Balochistan Province, the team found that bulldozers had been used to form levies on thousands of acres in the Turbat District to slow-down soil erosion caused by sporadic flooding. These levies showed as heavy field boundaries on the SPOT scenes causing the ASF lab to stratify parts of the topographical maps for these areas as intensive agriculture, (stratum 10) when in fact, they were not suitable for cultivation or pasture (stratum 41). Necessary corrections were made. In the Karachi area, it was found that some areas of dense, green, wild desert bushes produced a red color on the SPOT scenes indicating intensive agriculture (stratum 10). This stratification was changed to not suitable for agriculture (stratum 41).

In Punjab Province, the major find during the groundtruthing trip was with SPOT scenes that showed large expanses of gray to light blue colors, which is not the normal color for growing crops on cultivated land. However, when the team arrived at the selected sites to be verified, they found that the land, for the most part, was cultivatable. Most of this land had just been harvested for peanuts when the SPOT scenes were taken in October of 1989. All of the areas verified were also rain-fed.

All participants from the ADC Cell gained considerable experiences from these trips and they were especially helpful to the Statistical Assistants that do much of the stratification work.

### 3. SURVY ACTIVITY:

Enumerator OY training schools were held in Hyderabad and Lahore in mid-September for cotton, rice, maize and sugarcane. Objective yield survey field work got underway for all four crops during the quarter in the seven districts in the program. Post-harvest rice plots, to determine farmer harvest loss, were also layed-out and harvested. This was the first time post-harvest plots had been used in the ADC Project in Pakistan. The last samples for rice and maize were processed in the ADC Project laboratory in late December and summaries were prepared shortly after the quarter ended. Summaries of the rice OY and post-harvest loss survey results will be in next quarter's report. Data for maize, cotton and sugarcane were still being

collected as the quarter ended.

All OY data from both the Punjab and Sindh Provinces were processed in the ADC Project laboratory and keyentered and edited by staff from the ADC Cell of FBS. The data were then summarized by the ADC Project office.

After attending the mid-September OY enumerator training schools for the 1990 Kharif crops, the ADC Team Leader recommended several improvements to the ADC Cell, which are shown below in a quote from his memo. Plans are to implement all of these recommendations in the 1991 Kharif season.

**"MAIZE:**

- a. Questions have come-up about average ear weigh. Currently, enumerators start with the top ear on the first stalk and count the ears downward. They count up on the second stalk, down on the third, etc. During this process, they harvest the first and every fifth ears until 5 have been harvested. These ears are then sent to ADC lab for processing to determine the average ear weight. Since many of the ears in Pakistan are poorly filled out, I recommend harvesting two batches of 5 ears each to increase the randomness. Average ear weight can then be computed for the first and second batches separately and then for the two combined. If the average ear weights don't differ significantly, then only 5 total ears are needed for the average ear weight computation
- b. Enumerators are apparently counting ears without checking for the presence of kernels. According to the definitions, an ear is to be counted as an ear only if it has 1 kernel of grain or more. Therefore, I recommend that shucks on all ears considered for harvest by the enumerators be opened to determine whether or not kernels exist.

**RICE:**

- a. An optimum plot size study should be done in 1991 in conjunction with the regular OY survey. The 21.6" frame now being used often includes only two rice plants (due to the wide spaces between plants) which may be giving unrealistic yield indications. A study can be designed that will be practical to carry-out and grain from the research plots can be threshed in the OY lab.

**SUGARCANE:**

- a. The sample sizes were increased from 20 per district last year to 60 this year because the results from the 7 one meter partitions in the OY plot last year did not answer the questions about optimum plot size.

Hopefully, the plot size questions will be answered this year which will allow us to settle on the optimum plot size as we have already done for wheat.

#### COTTON:

- a. Enumerators had a lot of questions about the cotton OY survey. This is natural because its the most complex survey. A number of questions were asked this year during the training sessions. The answers to these questions were sent to the Chief of the Survey Planning and Estimation Section in a memo dated 8 Nov. 1990, and should be discussed next year during the enumerator training sessions.

#### GENERAL:

As Team Leader of the ADC Project, I have two basic recommendations that I feel would help improve the OY surveys based on my first attendance of the 1990 OY schools. These are:

- a. Use an overhead projector and plastic transparencies when teaching the enumerators, when practical, rather than having them follow along on their copies of the questionnaires. The transparencies can be used in conjunction with illustrations on the blackboard. Even though the current instruction is good, the overhead projector system would make it better. At the minimum, the projector could be used to supplement the current method of instruction and better hold the attention of the enumerators. The ADC Project office will purchase a compact overhead projector if one is needed and it can be taken to each enumerator training school by the ADC Cell instructors.
- b. Field training of enumerators should include all crops in the OY survey program if at all possible. Sometimes its difficult to find maize, sugarcane, rice, and cotton fields close enough together so that plots can be layed-out in all of them in one day. However, all enumerators need field training on all crops each year. If field exercises on four crops in one day in the Punjab are too much, it might be wise to use two days and have field exercises on two crops each day."

A trip was made by the ADC Team Leader, Program Specialist and Project Officer to Faisalabad during the quarter to take color slides in cotton and maize fields. The objective was to photograph items that have, in the past, caused confusion in the OY enumerator classroom. Some of the items photographed, follow:

- a) a fully-opened cotton boll
- b) a partially opened cotton boll
- c) a diseased cotton boll
- d) a large cotton boll

- e) an ear of maize (an ear must contain at least one kernel)
- f) counting ears in a broadcast maize OY plot
- g) counting ears in a line planted maize OY plot

During this trip, the three man team also a) had a meeting with the new Lahore ADC Project Director, b) discussed the January 1991 ASF acreage survey with the Director and c) monitored the new printing press installation.

The ADC Team Leader attended a Global Positioning System (GPS) equipment demonstration in Peshawar during the quarter to ascertain its applicability to ASF survey work. A summary from the Trip Report written by the Project Leader is quoted below:

"The GPS instrument is a hand-held, waterproof instrument that looks much like a portable telephone with a small electronic display screen. A person can stand any place in the world and activate its program. The instrument will attempt to locate 4 orbiting satellites. If it locates 4, it will do a 3 dimensional search (latitude, longitude, and altitude) and compute the location of the instrument to within approximately 1 meter accuracy. This will be displayed as latitude, longitude, and altitude on the instrument's screen. If the instrument locates only 3 satellites, it will do a 2 dimensional search (latitude and longitude only) and compute the location of the instrument to within approximately 15 meters accuracy. In the demonstration I saw, the instrument found only 3 satellites but did this and displayed the location (in latitude and longitude) in two and a half minutes. By mid-1991, 3-D availability of satellites will be possible on a 24 hour basis worldwide, so, its contemplated that little difficulty will be encountered in locating 4 satellites for a 3-D search.

In the ADC Project, enumerators layout land segments in many desert like areas where few, or sometimes no, defineable boundaries exist. The enumerator determines the use of all land in that segment and then revisits the same segment each year until a new segment is selected.

The GPS instrument may have some utility in helping to located segments in non-boundary areas. When the enumerator lays-out the original segment in a non-boundary area, he could use the GPS instrument to compute the latitude, longitude, and altitude of the segment. Then, on repeat visits, the enumerator could use the instrument to re-compute his location and he could compare this to his original location to determine whether or not he is in the correct location.

In addition, it could serve as a source of quality control. If the Provincial ADC Project Director had a list of longitudes and latitudes for problem segments, he could provide these to the enumerators. The enumerators could then locate the segments to the best of their abilities and have the GPS instrument calculate their locations. The enumerators would then bring these readings (stored in the memory of the instrument) back to the Director and

these readings would tell the Director whether the enumerators had 1) gone to the segments, and 2) found, or had not found, the correct location of the segments. These instruments currently cost \$ 2,500 each.

The ADC Team Leader, Program Specialist and Chief of the ADC Cell Survey Planning and Estimation Section invited Gary Archer, with the World Bank Resident Mission in Islamabad, to the Punjab to observe ASF OY procedures during the quarter. Visits were made to objective yield plots in rice, maize and cotton fields. All OY procedures used for each crop were fully explained to Mr. Archer. Mr. Archer is in the process of planning a survey to determine how much crop residue (wheat straw, maize stalks, etc.) is left in fields after harvest that could be used as a source of energy. He is planning to do a one-time survey but he is designing it in a manner that will enable others, who may want to repeat it in the future, to tie it to the ASF OY survey and, thus, avoid much duplication and expense. See the Trip Report in Appendix 3.

The Survey Activity Calendar for the January ASF Rabi Acreage survey was completed on October 16, considerably earlier than called for by page 10 of the Sixth Work Year Plan. A copy of this calendar is shown in Table 1.

#### 4. SAMPLING:

There were no sampling activities during the quarter.

#### 5. GOVERNMENT OF PAKISTAN SUPPORT:

The personal computers (PC's) in the ADC Cell have not been under maintenance contract in the past. As a result, the Computer Specialist from the ADC Project office has spent a considerable amount of time diagnosing problems and repairing PC's, when his time could be better utilized on his primary duties. Bid offers for PC maintenance were requested from local vendors during the quarter for all ADC Project supplied PC's.

Mr. Waqar Gilani, Computer Specialist for the ADC Project office, traveled to Hyderabad during the quarter to interview candidates for the computer programmer position needed in the Sindh Province ADC Project Director's office. By the end of this quarter, a qualified candidate had not been located.

#### 6. TRAINING:

Activities during the quarter included:

- a) training of officials from the ASF laboratory in field interpretation of SPOT imagery in the Lasbela and Turbat Districts of Balochistan, in the Karachi area of the Sindh and in the Islamabad and Rawalpindi Districts of the Punjab.

TABLE 1. JANUARY 1991 ASF ACREAGE SURVEY ACTIVITY CALENDAR

TARGET DATE	ACTUAL DATE	ACTIVITY
16-2-91	1/	Summaries completed.
12-2-91	1/	Clean edited data in Islamabad
10-2-91	1/	Clean edited data in the processing centers.
31-1-91	1/	All field work to data processing centers.
27-1-91	1/	All field work completed.
26-1-91	1/	525 segments through the first computer edit.
26-1-91	1/	Quality control completed.
15-1-91	1/	125 segments through the first computer edit.
07-1-91	1/	Survey work started.
05-1-91	1/	Enumerator training completed.
30-12-90	30-12-90	Data entry/ edit/ summary procedures installed at processing centers.
20-12-90	27-12-90	Training material and questionnaires ready/printed.
17-12-90	13-12-90	Project coordinators notified of training dates/time/location
13-12-90	30-12-90	Draft manual of instructions finalized.
01-12-90	29-12-90	Draft manual of instructions prepared.
19-11-90	18-11-90	Questionnaire and Forms A & B sent to FBS Karachi for printing.
15-11-90	18-11-90	Draft questionnaire finalized.
22-10-90	28-10-90	Draft questionnaire circulated for comments.
16-10-90	16-10-90	Survey activity calendar completed.

1/ These dates will be shown in the January - March Quarterly report

- b) continued on-the-job training of all laboratory employees in interpretation of SPOT scenes as construction of the frame moved ahead at a rapid pace.
- c) "hands on practice" in digitizing count units on topographical maps in the ASF lab continued as construction of the frame moved forward.
- d) Mr. Mohammad Younas, Statistician, NWFP, Agriculture Extension in Peshawar, returned after successfully completing three months training at the International Statistical Program center in Washington D.C.

#### 7. CONSULTATION:

The ADC Staff's consulting activities, outside the normal contact with FBS in Islamabad, included observation of field SPOT scene groundtruth procedures, computer/software installation, and computer training.

#### 8. DELIVERABLES FOR THE QUARTER:

The deliverables for the quarter, as defined in the **SIXTH YEAR WORK PLAN** included:

- o January ASF acreage survey activity calendar prepared by November 1, 1990
- o Maize and rice OY survey results finalized by December 13, 1990
- o Provide for maintenance/installation of all ADC Project funded equipment
- o FBS requested in house training provided in a timely manner
- o GOP requested consultation responded to in a timely manner.
- o July - September Quarterly Report presented by October 11, 1990

The last rice OY and post-harvest data were not received in the ADC lab until the end of the quarter. As a result, these summaries will be shown in the next quarterly report. The ADC laboratory was still receiving maize OY data from the field as the quarter ended. Therefore, the maize summaries will also be published in next quarter's report. In addition, the July-September Quarterly Report was presented on November 26, rather than in October. All other deliverables were met. A total of 185 topographical maps were stratified and digitized during the quarter, far exceeding the 168 specified by page 2 of the Sixth Year Work Plan. In addition, the January ASF survey activity calendar was prepared on October 16, considerably ahead of schedule.

**ADC PROJECT OFFICE TRIP REPORT**  
**Sept. 23 - Oct 2 & Oct. 9-17, 1990**

**Traveler:** Robert L. Addison, Team Leader, ADC Project

**Copies To:** Dr. Thomas M. Olson, Division Chief, ASSP/ARD/USAID  
Mr. M. Jalil Ahmed, Project Officer, ASSP/ARD/USAID  
Mr. Sharif Ahmed Khan, Director ADC/FBS  
File

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**GROUNDTRUTHING SATELLITE SPOT IMAGERY**

Purpose of the trip: During construction of the Pakistan Area Sampling Frame (ASF), spot satellite imagery (scene) is the primary document used for stratification of all land in Pakistan according to its use -- such as intensive agriculture, extensive agriculture, land not suitable for cultivation or pasture, etc. A certain color on the spot scene is indicative of something that can be found on the ground. For example, dark blue on the spot scene usually means water, some shade of red implies healthy, growing crops, white to light tan or gray means harvested land or certain types of barren soils. Also, definite field patterns on the spot scenes should indicate cultivateable fields. Both of these trips were for traveling to remote areas of Balochistan Province to check questionable areas on the spot scenes against what actually existed on the ground. This is necessary in order to determine whether the stratification of land in this Province, according to its use, has so far been done correctly.

Findings: Topographical maps and spot scenes that had presented some stratification difficulties in the Islamabad ASF laboratory were taken to the field. The first trip gave us the opportunity to check out problem areas in the Sibi, Quetta, and Ziarat areas. The Chief of the FBS/ADC Cell and the Head of the ASF Section and 3 of his 6 Statistical Officers, having responsibility for stratification of the topographical maps, organized this trip. The second trip made it possible to visit questionable areas in the Karachi and Turbat areas. The Chief of the FBS ADC Cell and the Head of the ASF Section, plus the other 3 of his 6 Statistical Officers organized this trip. This division of Statistical Officers between the two trips made it possible for all of them to see in person some of the areas they had responsibility for stratifying in the lab.

After driving many miles and visiting many areas during these two trips, the team uncovered a number of items that certainly made the trips worthwhile. Some of the more important findings follow:

- Continued -

Appendix 1  
(Continued)

- 1) In the Quetta, Ziarat areas, there are many high mountains and, therefore, numerous mountain valleys. The growth in some of these valleys produced a red color on the spot scene meaning that these valleys contained growing, green, healthy crops. As a result, some of these areas were stratified as intensive agriculture on the topographical maps (stratum 10) when in fact they were orchards (stratum 62).
- 2) In the Sibi area, there are many vast, barren, flat plains. Bulldozers had been used to form levies on thousands of acres to slow-down soil erosion caused by sporadic flooding. These levies showed as heavy field boundaries on the spot scenes causing the ASF lab to stratify some of the topographical maps for these areas as intensive agriculture (stratum 10) when in fact these areas were land not suitable for cultivation or pasture (stratum 41).
- 3) In the Turbat area, a similar problem was found with levies on barren land appearing as field patterns and causing some incorrect stratification.

An additional problem found in the Karachi area was one of dense, green, wild desert bushes producing a red color on the spot scene and causing the lab to stratify corresponding areas on the topographical maps as intensive agriculture (stratum 10). Upon inspection, we found that many of these questionable areas were not suitable for agriculture (stratum 41) or contained some intermixed field crops or orchards and, therefore, should have been stratified as 1 to 29 percent cultivated (stratum 31) rather than stratum 10 which is 60 percent or more cultivated.

Both of these trips paid big dividends because the officials of the ADC Cell found that some of their stratification work for Baluchistan Province had been done incorrectly. They have since returned to their ASF lab in Islamabad, started reviewing all of the topographical maps stratified to date for Baluchistan Province, and will correctly stratify those that are in error. It is expected that not too many of the total topographical maps will need correction because most of them are for mountainous areas of the Province, where no agriculture exists, and these will need no correction. However, it was most important that the incorrect stratification was found because most of it involved stratum 10 that should have been stratum 31, 41 or 62. When surveys are started in the province, if the correction had not been found, a large number of sample segments would have been incorrectly placed in stratum 10 and enumerators, rather than finding intensive agriculture upon visitation of the segments, would have found something quite different. This would have been

- Continued -

Appendix 1  
(Continued)

confusing to the enumerators, not cost efficient and would have introduced a considerable amount of sampling error into the province survey results.

All of the Statistical Officers on these two trips learned a great deal about identifying different types of land uses on the spot scenes. In the future, when they see the same types of problem areas that we visited on other spot scenes, they will recognize them and, therefore, stratify the topographical maps with a greater degree of reliability.

Groundtruthing is an important part of accurate stratification. Land characteristics will give somewhat different color images on the spot scenes as we start work in each of the four provinces in Pakistan. Groundtruth work should be done in each province until the stratification personnel can accurately identify what they see on the spot scenes - because proper stratification of the land is the "heart" of an Area Sampling Frame.

The Area Sampling Frame Section in the ADC Cell of FBS will write a detailed report summarizing all findings during these two trips.

ADC CELL TRIP REPORTS  
Sept 23-Oct 2 & Oct 9-17, 1990

TRIP REPORT REGARDING CHECKING/VERIFICATION OF STRATIFICATION  
WORK DONE IN ASF LABORATORY BY USING SPOT SATELLITE IMAGERY  
FOR QUETTA/ZIARAT/LORALAI/SIBIDERA MURAD JAMALI IN  
BALUCHISTAN PROVINCE

A field trip to Balochistan province was arranged for field verification of stratification work done in the ASF laboratory. In this trip M/s. Khakan Babar, Hafiz Bashir Ahmad and Iftikhar Ahmad Cheema, Statistical Officers, Mr. Khalid Mahmud, Chief Statistical Officer, Mr. Sharif Ahmad Khan, Director and Mr. Robert L. Addison, Team Leader visited Quetta/Ziarat/Loralai/Sibi/Dera Murad Jamali areas w.e.f. 23-9-90 to 3-10-90. Detailed tour report is as under:

23-9-90

Left Islamabad to Quetta at 14:30 P.M. and reached at 15:45.

24-9-90

Travelled to Ziarat from Quetta and topomap No. 34-N-11 was verified as follows:

- i. This area lies near Ziarat city. The topomap indicates scattered trees on the mountains. The topomap also shows a forest boundary whereas SPOT scene does not indicate such information. So, on the basis of the SPOT scene which indicates mountain, St.41 was temporarily assigned to this area to be changed subsequently on the basis of actual field verification. On verification of this area, there was extensive forest on the mountains. Hence St.61 (forest) instead of St.41 has been allotted to this area.
- ii. This area starts before 25 km from Ziarat on Ziarat-Quetta road and was assigned St.10 on the basis of topomap. When this area was checked, there were orchards in this whole area. Consequently, St.62 has been allotted to this area instead of St.10 which was temporarily assigned during stratification in the laboratory.

- Continued -

Appendix 1  
(Continued)

- iii. An area about 10 km from Zaranda on Zaranda-Mand road was also verified. Zaranda itself is situated about 20 km away from Ziarat on Ziarat-Quetta road. That valley was also given St.10 on verification, it was found an orchard area though there were some patches of agriculture but as most of the area belonged to orchard (St.62), therefore, it was stratified under stratum 62.
- iv. Verification of the city boundary of Ziarat city indicated that the stratification work done in ASF Laboratory was correct.

It is also generally observed that mountain foothills are good boundaries for stratification in Balochistan province.

25-9-90

Left Ziarat for Loralai and verified topo map No. 39-B-11 as follows:-

- i. Area about 6 km before Loralai near village Pathan was verified as St.62 (orchard) whereas originally, it was stratified under St. 10.
- ii. Verified St.10 in the vicinity of Loralai and found stratification true according to ground truth.
- iii. Verified St.62 near village Zhangiwai and found that orchard area has increased. It was decided that area should be correctly transferred from SPOT to topo map as SPOT is a upto date source of information.
- iv. The area 10 km from Loralai-Qila Saifullah Road was assigned St.20. However, on verification it was observed that the area has orchards. Therefore, it was decided to stratify this area as orchard according to SPOT scene.
- v. St.10 was assigned to the area along the road on Loralai-DG Khan in the laboratory. Verification indicated that it was not according to ground truth. Therefore, it was assigned St.20 instead of St.10. Returned to Quetta via Ziarat.

Left Quetta for Sibi on 26-9-1990.

- Continued -

27-9-90

Areas delineated on topo map No. 39-D/1 were checked. The first area on the map was about 60 k. from Sibi. This area was 15 km. away from Balpat (near railway station Choukhra) and the team went inside the area and verified the stratification completed on the basis of large field patterns visible on SPOT scene. This area was assigned St.10 in laboratory which was not found correct. It was verified that the field boundaries visible on SPOT scenes are generally demarcated to stop flowing water towards, population and public investments. It was decided that whole of land should be stratified under St.41. This type of area was verified upto village Iqbal Gabol. Later on another area on topo map No. 34-P/3 around village Chalgaihi which was about 10 to 15 km away from Balpat on Balpat-Bhagh road was verified and it showed the same type of field patterns as observed in the earlier topomap. However, colour on SPOT was different, on verification it was also assigned St.41 and the colour was different because of bushes grown in this area. Later visited to Bhagh town where blared dark red area appeared on SPOT checked which was verified as grass land instead of agriculture.

29-9-90

Travelled Dera Murad Jamali which was about 130 km from Sibi and verified topomap No. 39-D0-6 & 34-P-15. It was found that area on one side of canal towards Dera Murad Jamali was full of agriculture whereas on other side of the canal the area was totally barren. The area where there was no agriculture also assigned St.10 keeping in view the field patterns observed on the SPOT. However, the whole area was assigned St.41. Then verified the area by going towards the tail of the canal. On SPOT there were reddish coloured spots which were verified as agriculture. It was agriculture because the farmers lifted water with the help of pumps, from canal for irrigation purposes.

29-9-90

Verified the two points on topo map No. 34-D-14 around Sibi city.

- i. Forest on Sibi-Gulu Shahar road was verified and found according to the stratification done in the laboratory. It was decided to correct its delineation according to SPOT information.

- Continued -

Appendix 1  
(Continued)

- ii. Verified darkish red areas visible on SPOT scene No. 187-291 (topo map No. 34-0-14 near village Kura about six km away from Sibi). On the ground, it was found that there were heaps of wheat straw in the area that indicated that it was wheat growing area. On verification, it was found that wheat was grown during last Rabi season. The colour on SPOT scene of that area was blakish red because the SPOT scene relates to late March, 1990 and wheat is usually ripped early in Sibi areas and the colour on SPOT scene indicated the colour of ripped crop.

Returned back to Quetta.

30-9-90

- i. Travelled towards Quetta - Pashin road upto 20 km away from Pishin city and verified the area along road side on topo map No.34-N-02. It was verified that St.10 given on map in the laboratory was not correct therefore, it was changed to St.62 & 41 as per factual position.
- ii. Went Pishin - Karbala road and verified the area along the road side. Some area of topo map No. 34-J-14 was stratified under St.10 in the laboratory which was changed into St. 41 according to ground truth.

1-10-90

Travelled to Kuchlak town and then travelled 15 km on Kuchlak - Ziarat road & verified the area along the road side. The area from Kuchlak was stratified according to factual position but the onward area which was stratified under St.10 was verified as orchard area (St.62). Necessary changes were made on the map.

2-10-90

Left Quetta for Islamabad.

TRIP REPORT REGARDING CHECKING/VERIFICATION OF STRATIFICATION  
WORK DONE IN ASF LABORATORY BY USING SPOT SATELLITE IMAGERY  
FOR MEKLAN/LASBELA/KARACHI.

A field trip to Balochistan (Mekran & Lasbela) and Karachi was arranged for field verification of Stratification work done in ASF Laboratory. On this trip M/s Haji Khadim Hussain, Ejaz Mahboob and Abdul Ghafoor Gondal, Statistical Officers, Mr. Khalid Mahmud, Chief Statistical Officer, Mr. Sharif Ahmad Khan, Director and Mr. Robert L. Addison, Team Leader visited Mekran Division/Lasbela/Karachi areas w.e.f. 09-10-90 to 17-10-90.

9-10-90

Departure from Islamabad to Karachi. Left Islamabad at 7:30 P.M. and reached Karachi at 9:05 P.M.

10-10-90

Travelled to the area near Uthal distt. (Lasbela) for verification of topomap No. 35-K/9. There were agriculture field patterns on the SPOT scene and as such the area was stratified as St.31 & St.20. On field verification, it was observed that the area stratified into St.20 has low intensity of agriculture, therefore, the area was assigned St.31.

Then travelled to the area near Jumman Goth 15 km from Uthal. The area was stratified into St.10 & St.20 on the basis of information of topomap. However, it was observed that there was scattered agriculture and therefore, it was assigned St.31 and delineated according to SPOT scene.

11-10-90

(Second day). Proceeded to Turbat by Air. Left Karachi at 6:30 A.M. and reached Turbat at 8:00 A.M. The field verification started on the same day.

11-10-90

Travelled towards Nasirabad area to check the st.20 & 62 on topomap No. 31-J-18 & 31-J-12. The area on SPOT scene showing red/brown colour was assigned st.62 (orchards) and on verification, it was found correct. However, it was decided to delineate the boundary of the orchards according to SPOT information.

- Continued -

Appendix 1  
(Continued)

Area along the road side showed bunches of trees on topomap whereas SPOT scene was not clearly showing whether there was any agriculture or not. However, this area was assigned St.10 and 20 in the laboratory. On verification, it was found that the area is totally barren and therefore, it was decided to assign St.41. It was found that some villages covered lot of area but not delineated separately as they were not visible on SPOT scene. However, it was decided that all big villages which could not be seen on SPOT scenes but are given on topomaps should be delineated separately.

Then the team travelled to Mand, 130 km from Turbat upto the Iranian boarder. Through-out the journey no agriculture was found so it was decided that the area which was stratified as St.20 should be changed to St.41.

12-10-90

The team travelled towards Pasni & Gowader for checking of topomaps No. 31-J-8 & 31-F-16.

The area towards Pasni from Turbat along the road side was found barren. The area after Pasni towards Gowader was stratified as St. 20 with the help of the topomap and SPOT scene as some blush patches found on the SPOT scene were considered as agriculture. On verification it was observed that the blush patches on SPOT were of rainy water which was stood there when the SPOT scenes were obtained. Therefore, this area was decided to be assigned St.41.

Some area was stratified as intensive agriculture (St.10) but on field verification with the exception of very few agricultural fields, no such features were identified so it was decided that St.31 looks to be more appropriate than St.10. SPOT scene also confirmed this.

Then went towards Khandasal 73 km from Pasni towards Turbat to Check St.31. all the area up to the required point was found barren, so it was decided that the area should be given St.41.

13-10-90

Travelled towards Mand to verify features on topomap No. 31-K/9 & 31-K/5.

- Continued -

Appendix 1  
(Continued)

The first point at Kuntdar was checked and found the whole area unsuitable for cultivation, but that was stratified as St.20 on topomap so, it was decided to assign St.41. another area was assigned St.31 as the SPOT scene was showing some scattered light brownish patches which were found very scattered agricultural fields and it was decided to classify the area into St.41. Then went upto Pittak and verified the stratification done in the laboratory. The topomap showed intensive agricultural fields which were not cleared from the SPOT scene as there were some blush patches. However, on verification it was found that there is agriculture but of low intensity so it was decided that the area be changed to St.31 instead of St.10.

On topomap (31-K/9) there appears to be dense mixed forest which was not delineated as that was not clearly visible on the SPOT scene. so it was decided that in such cases information given on the topomap, if updated after 1980, may also be consulted.

14-10-90

Travelled towards Panjgur to check the stratification delineated on topomap No. 31-N/14.

After two & half hours long journey the team reached at the first point i.e. Bazar Ali Jan (a village). Bazar Ali Jan which was not visible on SPOT scene and also appears to be very small on topomap was left unmarked, but on field checking the same Bazar appeared quite large so it was decided that the village should be delineated. The stratification in the laboratory was done with the help of topomap as SPOT scene was showing scattered red patches which were not clear. On verification, it was found that the whole area is generally barren. So it was decided to change St.10 & 31 to St.41.

The area where St.41 was given in the laboratory was found correct. However, the same area was not clear from the SPOT scene.

15-10-90

The boundary of Turbat City (Topomap No. 31-N/4) which was delineated on topomap was found OK. A slight change has to be made as the population expanded a little bit and this change would be delineated from the SPOT scene.

Returned to Karachi on 15-10-90.

- Continued -

16-10-90

The area on topomap No. 35-P/5, 35-K/16, 35-L/13 in Hab and around Karachi were verified.

The areas from Mauripur upto Hawksbay/Paradise point were checked. The main objective was to check the delineation of security areas near Mauripur. It was found that it is difficult to undertake such verification from security point of view. It was also decided that security areas may be delineated if information is given on topomap.

Then the team went towards Paradise point & checked St.31. The whole area showed no sign of agriculture except patches of bushes. So it was decided that St.41 should be given to this area.

From Paradise point the team went to Hub area in Balochistan province. The area had extensive as well as intensive agriculture and the SPOT scene provided an uptodate information, therefore, it was decided that the delineation already completed should be corrected in the light of SPOT information.

The area near Malir was then checked. The SPOT scene was showing orange and dark orange patches which gave the indication that there might be some agriculture fields were found which were mixed with orchards and bushes (which covers a lot of area) but it was quite impossible to separate them. so it was decided that the area should be given St.20 (decreasing the intensity of the area instead of giving St.10).

17-10-90

Left Karachi for Islamabad.

Following are the main findings and conclusions which have been drawn from the two field trips undertaken in the Balochistan province.

**MAIN FINDINGS:**

1. During verification/checking it was observed that there were problems in stratification work done in the laboratory wherever the features of the topo maps, particularly if they are old, were preferred over features of SPOT scenes.

- Continued -

Appendix 1  
(Continued)

2. If the features of the SPOT scenes are not clear due to false colour combination then wrong stratification is possible e.g. on one SPOT scene the area near village Kuntdar (distt. Turbat) did not show any forest while the topo map was showing a sizeable area covered with dense forest, which was later on confirmed during our field verification/checking.
3. As for as populations (Rural & Urban) are concerned, it is very difficult rather impossible to get delineated from the SPOT. It was seen during field visits in Balochistan province that some villages are considerably large but are hardly seen on the SPOT scene.

CONCLUSION:

1. the features given on the SPOT scene should always be preferred over the features on the topo maps.
2. The survey period of the topomap must be taken into consideration before starting stratification i.e. the topo maps whose survey period are 1980-81 & onwards could be used for help in stratification according to the features as appeared on the topo map, if & only if the features of the SPOT scene are not clear/visible.
3. Personal judgement & assessments sometime differs from person to person regarding reading of colours of SPOT scenes. so in such cases it is better to have discussions among colleagues and get at one conclusion.
4. In case of ambiguities found on the SPOT scene regarding land utilization then verification/checking is necessary in order to increase the quality of the work.
5. Villages/towns, if not visible on SPOT scene, should be stratified on the basis of topomap keeping in view the minimum size as already worked out.
6. General topographical conditions of the areas should also be kept in mind. the areas of Ziarat, Quetta, Chaghi, Loralai and Pashin are orchard areas, therefore, the belt from Quetta to Loralai/Zhob generally belongs to orchards and should be stratified accordingly keeping in view the SPOT information.

ADC PROJECT OFFICE TRIP REPORT  
Dec. 20 & 22-24, 1990

Traveler: Robert L. Addison, Team Leader, ADC Project

Copies To: Dr. Thomas M. Olson, Division Chief, ASSP/ARD/USAID  
Mr. M. Jalil Ahmed, Project Officer, ASSP/ARD/USAID  
Mr. Sharif Ahmed Khan, Director ADC/FBS  
File

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GROUNDTRUTHING SATELLITE SPOT IMAGERY

Purpose of the trip: During construction of the Pakistan Area Sampling Frame (ASF), spot satellite imagery (scene) is the primary document used for stratification of all land in Pakistan according to its use -- such as intensive agriculture, extensive agriculture, land not suitable for cultivation or pasture, etc. A certain color on the spot scene is indicative of something that can be found on the ground. For example, dark blue on the spot scene usually means water, some shade of red implies healthy, growing crops, white to light tan or gray means harvested land or certain types of barren soils. Also, definite field patterns on the spot scenes should indicate cultivateable fields. This trip was for traveling to rainfed areas of the Rawalpindi and Chakwal Districts of Punjab Province to check questionable areas on the spot scenes against what actually existed on the ground. This is necessary in order to determine whether the stratification of land in the rainfed areas of this province is being done correctly.

Findings: Topographical maps and spot scenes that had presented some stratification difficulties in the Islamabad ASF laboratory were taken to the field. The trip gave us the opportunity to check out some problem areas in the Rawalpindi and Chakwal Districts. The Chief of the FBS/ADC Cell and the Head of the ASF Section and all 6 Statistical Officers, having responsibility for stratification of the topographical maps, organized this trip. In addition, all Statistical Assistants that work in the stratification lab were taken on this trip, so all persons engaged in the work could see some of the areas they had responsibility for stratifying.

After driving many miles and visiting many areas during this trip, the team uncovered a number of items that certainly made the trips worthwhile. Some of the more important findings follow:

-Continued-

Appendix 2  
(Continued)

1) Some of the SPOT scenes showed black colored areas mixed in with red areas. Red usually indicates green, growing crops. When we got to these areas, we found all of the land cultivated. This caused some confusion because cultivated land is usually red (if crops are growing) or grayish (if crops have been harvested). It caused the question to be raised, "are all dark colored areas scattered among red colored areas on the SPOT scenes indicative of cultivated land - - if not how do we separate the dark cultivated from the dark un-cultivated?" We had not seen these dark brown patches scattered among the red when stratifying Balochistan Province.

2) Some SPOT scenes showed large expanses of gray to light blue colors. When we arrived at the selected sites to be verified, we found that the land was cultivatable. The question then arose, "are all of the grayish-blue areas on these SPOT scenes land that can be cultivated?" If not, how do we separate the gray - bluish cultivated from the uncultivated.

**NOTE:** Practically all of the areas visited during this trip had just been harvested or were in the process of harvesting peanuts when the SPOT scenes were taken in October 1989. All of the area is also rain-fed.

To help clarify some of the un-answered questions that arose on this trip, several 1:50,000 scale prints have been ordered that will provide more definition. The SPOT scenes used during the trip were 1:100,000.

All of the Statistical Officers and Statistical Assistants on this trip learned a great deal about identifying different types of land uses on the spot scenes. In the future, when they see the same types of problem areas that we visited on other spot scenes, they will hopefully recognize them and, therefore, stratify the topographical maps with a greater degree of reliability.

Groundtruthing is an important part of accurate stratification. Land characteristics will give somewhat different color images on the spot scenes as we start work in each of the four provinces in Pakistan. I have told the ASF Section that groundtruth work should definitely be done in each province until the stratification personnel can accurately identify what they see on the spot scenes - because proper stratification of the land is the "heart" of an Area Sampling Frame. The Area Sampling Frame Section in the ADC Cell of FBS will write a detailed report summarizing all findings during this trip.

ADC CELL TRIP REPORT  
Dec 20 & 22-24, 1990

TRIP REPORT OF POTOHAR REGION REGARDING VERIFICATION OF  
DIFFERENT FEATURES ON SPOT SCENES AND TOPO MAPS  
W.E.F. 20-12-90 TO 24-12-90

Land features of Pakistan can be broadly divided into three categories such as plains, mountains and semi mountains/plains (Potohar region) areas. Area sampling frame (ASF) laboratory has recently started ASF construction of Potohar region (Rawalpindi Division). The land characteristics of this region are of quite different nature compared to the already completed mountain areas of Balochistan and plains areas of Punjab and Sindh provinces.

Features of Potohar region:

1. The potohar region is un-irrigated (Barani) area. the cultivation in this region depends only on rain.
2. The land of this region is un-even. It is not so flat as Punjab and Sindh and not so mountaineous as Balochistan and NWFP.
3. The absorptive capacity of moisture by the cultivated land is greater than other regions.
4. The mountains situated in Murree and Kahuta tehsils of Rawalpindi district are covered with pine trees.

Due to varied nature of areas in Potohar region lot of ambiguities in stratification work were found. In order to verify the ambiguities in the stratification work, a four days field trip in Rawalpindi division was arranged. Detail of tour and findings are as under:

20-12-90

195-283  
(SPOT scene)

i. Checking of stratum 10 near villag Gulial

- Continued -

43-C-B  
(Topo map)

This area lies near village Gulial, district Attock which is at the distance of 55 Km from Fateh Jang on Fateh Jang-Talagang road. The topo map indicates this area as intensive agriculture but the SPOT is showing a mixture of black brown and bluish colours.

On field visit, it was found that the ditches have reflected light bluish colour and cultivated fields have shown brown colour, but could not reach on conclusion regarding black colour. so, on the basis of the field visit this area was decided to be stratified into stratum 10.

ii) Checking of Bluish colour

This area lies near Dhok Pathan which is about 70 km from Fateh Jang on Talagang road. The topo map indicates this area as the branches of Nala. These branches are of Bhianwala Kas. On checking Bhianwala Kas, this area was found totally rocky. there are also big ditches in this area. The rocky area of Bhianwala Kas has been depicted as light bluish colour on SPOT scene which was decided to stratified into st.41.

iii. Checking of stratum 10

This area is situated near village Murali distt. Chakwal which is about 15 km before Talagang on Fateh Jang road.

The topo map shows this area as very good agriculture which can be stratified into st.10 but the SPOT shows this area in black and red patches. On field verification it was found that this area was very good agriculture which will be stratified into st.10. But so far as the black patches regarding this area are concerned these could not be confirmed. so, it was decided that more black patches will be checked in order to know the reasons of black colour.

22-12-90

196-284  
(SPOT scene)

i. Checking of Grey Area

- Continued -

43-G-4  
(Topo map)

This is situated around Daultala village, distt. Chakwal which is about 60 km from Rawalpindi on Chakwal road. the whole topomap indicates this area as having good agriculture but the SPOT shows this area as grey with small scattered red dots. Team contacted some farmers of that area who informed that in this area Peanut was cultivated in April and the same was harvested in October and November. Moreover, they had also cultivated Jawar and Bajra in this area. As all these crops become mature in October and SPOT scene also related to October and as such mature crops were depicted in grey colour.

195-283  
(SPOT scene)

ii. Checking of black patches

This patch is near village Mahta, distt. Rawalpindi which is about 95 km from Rawalpindi on Rawat-Dhudial road.

43-C-283  
(Topo map)

On field verification this area was found as having good agriculture but we could not accurately locate the black patch. So, it was decided that a new SPOT at the scale of 1:50000 be acquired from SUPARCO and a further study be undertaken regarding black patches.

iii. Checking of st.10

This area is situated around the village Karahi which is about 100 km from Rawalpindi on Dhudial-Rawat road.

The topo map indicates this area as good agriculture which could be stratified into st.10 but SPOT does not show such intensity of agriculture. On checking of this area it was found that there were lot of ditches and as well as agriculture which matched to the SPOT information. So, it was decided that such area should be stratified into St.20 or 31 depending on the intensity of agriculture in the light of SPOT as well as topo map information.

- Continued -

23-12-90

196-284  
(SPOT scene)

i. Checking of st.10

43-H-01  
(Topomap)

This area is situated near chak Baqir shah which is 20 km from Chakwal on Sohawa-Chakwal road. The topo map indicates this area as good agriculture, but such intensity of agriculture was not visible on the SPOT scene. The SPOT signifies only small scattered red dots surrounded with light grey and white dots.

When team visited this area, there was good agriculture in this area. Some local farmers were contacted who informed that they cultivate mostly Peanut, Jawar and Bajra which mature in October/November. The red dots are the colour of those crops which had not attained maturity and light grey colour was the result of the matured crops. So, this area was decided to be stratified in st.10.

ii. Checking of st.10

This area lies near village Basharat which is at the distance of 10 km from Choa Saidan Shah. the topo map shows this area as good agriculture but the SPOT scene indicates this area like barren land.

On checking physically this area showed good agriculture. When inquired from the local persons about this piece of land, having been shown as barren land on the SPOT scene, it became clearer that in most of this area, Peanut had been grown and some areas had been left uncultivated for the preparation of the next crop. So, this area was decided to be stratified into st.10.

iii. Checking of st.61

This area also lies near Chak Basharat which is about at the distance of 13 km from Choa Sadan Shah. the topomap indicates this area as a forest, but SPOT scene was showing barren mountains.

When visited this area, there was forest over the mountains but was not dense due to which SPOT did not provide this information. So this area was assigned as st.61 keeping in view the topo information. However, it is now evident that the mountains covered with forests are depicted more dark redish than the bare mountains or having forest of low intensities.

24-12-90

197-283  
(SPOT)

i. General checking of Topomap No. 43-G-7.

43-G-7  
(Topomap)

The area of this topo map is around Gujar Khan city, Kallar Saidan and village Qazian. The whole topo map could be stratified into st.10 and 20 on the basis of information given on the topo map. But such intensity of agriculture is not visible on the SPOT scene. The Team visited points near Qazian, Jabbar and Motua Gujar. It was found that there were also many ditches in this area. So, it was decided that some portions be stratified into st.20 and other areas mixed with ditches and agriculture be stratified into st.31 by consulting both SPOT and topomap.

197-283  
(SPOT)

ii. Checking of st.20 & 61

43-G-11  
(Topomap)

This area is near village Palina and Naya Chakiana which is about 30 km from Gujar Khan falling near river Jhelum which serves as a boundary between Pakistan and Azad Kashmir. The topo map shows this area as agriculture falling in st.20, and also forest which were not clear on the SPOT scene. The SPOT scene has shown some patches of barren land between the mountains but forest was not visible on the mountains. When checked this area, there was agriculture as well as forests so this area was decided to be stratified into st.20 and 61 by taking the information both from SPOT scene and topo map.

- Continued -

iii. Checking of st.20 & 61

This area starts at the distance of 13 km from Kahuta and leads upto Azad Pattan.

The topo map shows this area as forest and agriculture falling into st.20. Team visited this area upto river Jhelum where it separates Pakistan from Azad Kashmir. This whole of the area is mountainous with dense pine trees. There were also small patches of agriculture on the mountains.

No doubt SPOT scene was showing dark redish colour which indicated the colour of forest, but there were also some patches of agriculture given on topo maps which were also confirmed physically. So it was decided that this area be demarcated as forests keeping in view the SPOT as well as topomap information. However, small patches of agriculture shown on topo map be stratified as st.31 in order to catch the agriculture.

**FINDINGS:**

1. The experience gained from the tour shows that matured crops such as Peanut, Jowar and Bajra have been depicted in grey colour. Therefore, such areas will be stratified into st.10 or 20 or 31 depending on the intensity of agriculture.
2. If SPOT information indicates dense forest on hills the same will be delineated accordingly. However, to catch small patches of agriculture, topographic information will be used to separate such areas from forests.
3. If, it is possible to stratify ditches into st.41 that is best but if it is not possible to stratify ditches separately and there is sparse agriculture in between the ditches, then such areas will be stratified into st. 31.

ADC PROJECT OFFICE TRIP REPORT  
Oct 28 - 30, 1990

**Traveler:** Robert L. Addison, Team Leader, ADC Project

**Copies to:** Dr. Thomas M. Olson, Division Chief, ASSP/ARD  
Mr. Muhammad Jalil Ahmad, Project Officer, ASSP/ARD  
Mr. Sharif Ahmad Khan, Director, ADC/FBS  
File

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**OBJECTIVE YIELD TRAINING MATERIALS**

**Purpose of the trip:** Mr. Gary Archer, with the World Bank Resident Mission in Islamabad is working on a Pakistan Household Energy Strategy Study. His objective is to determine how much plant residue is left in Pakistan fields after harvest. Examples: how much wheat straw or maize stalks are left in the fields after the crop is harvested. He has visited the ADC Project office on several occasions and exchanged ideas with me and Program Specialist. Mr. Archer's study will be conducted in 1991 and, as of now, is not scheduled to be repeated. However, he wants to design his study so that it can be tied to the ADC's objective yield survey plots if GOP wants to repeat his 1991 study at some point in the future. I volunteered to take Mr. Archer on an objective yield quality assurance field trip to accomplish two things: (1) check on the quality of work being done by the FBS enumerators, and (2) show Mr. Archer how the objective yield plots are layed-out and harvested in order to facilitate the design of his study.

**Findings:** The following people went on the trip: Me, Mr. Archer, Mr. Jamil Rajput, the ADC Project's Program Specialist and Mr. Shahid Naeem, Head of the FBS ADC Cell's Survey Planning and Estimation Section. Mr. Naeem has responsibility for training the field enumerators and supervising their field activities. The group flew to Faisalabad late on October 28 and made final arrangements to start field work early the next morning. The next morning, October 29, we were joined by the FBS Statistical Officer for the Faisalabad district and one of his field enumerators.

We proceeded to the field and watched the enumerator lay-out maize and rice objective yield plots. The enumerator harvested the rice plot and explained how he would harvest the maize plot (the maize was not yet mature). The enumerator also went to a rice field that had been harvested and illustrated how a post harvest plot to measure farmer harvesting losses would be layed-out and harvested.

-Continued-

Appendix 3  
(Continued)

The next day, October 30, we again went to the field and observed while the enumerator illustrated how to lay-out and harvest cotton and sugarcane objective yield plots. The sugarcane work was done in a field that was being harvested at the time. The cotton plot was layed-out in a field not yet mature, so the enumerator explained how to harvest this plot.

We made a few corrections in the way the enumerator conducted his field operations, but for the most part, he understood his objectives and did an excellent job.

Mr. Archer stated a number of times that the field observations and explanations had erased many of the questions he had and greatly simplified the further design and planning of his energy study.

All of us from the ADC Project office and from the ADC Cell of FBS learned more than usual on this trip because of the numerous questions asked at each plot by Mr. Archer. It also gave us an opportunity to show that the ADC Project has very broad applications and can be used to collect a wide variety of statistics, not just those on acreage, yield and production of crops.

We returned to Islamabad late the night of October 30.

OCT - DEC, 1990 COMMODITY UTILIZATION  
(VEHICLES)

VEHICLE TYPE	CHASSIS NUMBER	LOCATION	***** KILOMETERS *****		QUARTER USAGE	ASSESS- MENT OF USAGE	COMMENTS
			BEGINNING QUARTER	ENDING QUARTER			
LAND CRUISER	16331	FBS/ISLAMABAD	80,740	88,649	7,909	FULLY USED	
PAJERO JERP	400205	FBS/ISLAMABAD	82,580	-		NOT IN USE	
PAJERO STAWGN	400766	FBS/LAHORE	59,548	N/A		FULLY USED	
PAJERO STAWGN	400832	FBS/LAHORE	65,485	N/A		FULLY USED	
LAND CRUISER	16326	AG DEPT/HYDERABAD	N/A	N/A		FULLY USED	ASSIGNED TO MINISTRY OF AG.
PAJERO JERP	400548	AG DEPT/HYDERABAD	114,212	154,191	39,979	FULLY USED	
PAJERO STAWGN	400834	AG DEPT/HYDERABAD	N/A	105,082		FULLY USED	
LAND CRUISER	16577	AG DEPT/LAHORE	172,794	188,207	15,413	FULLY USED	
PAJERO JERP	400345	AG DEPT/LAHORE	158,605	168,825	10,220	FULLY USED	
PAJERO STAWGN	400833	AG DEPT/LAHORE	91,692	-		FULLY USED	
PAJERO JERP	400318	AG DEPT/PESHAWAR	N/A	100,400		FULLY USED	
PAJERO JERP	400336	AG DEPT/QUETTA	54,000	54,655	655	FULLY USED	
PAJERO STAWGN	400835	AG DEPT/QUETTA	35,000	38,050	3,050	FULLY USED	
HI ACB	2995	ADC OFFICE	52,463	56,542	4,079	FULLY USED	AD 64 405
LAND CRUISER	30289	ADC OFFICE	70,338	71,061	723	FULLY USED	AD 64 404
LAND CRUISER	33794	ADC OFFICE	55,571	-		TRANSFERRED	USAID 417
LAND CRUISER	33798	ADC OFFICE	75,836	-		TRANSFERRED	USAID 418
PAJERO STAWGN	400204	ADC OFFICE	77,676	79,292	1,616	FULLY USED	AD 64 486
PAJERO JERP	400487	VPC OFFICE	N/A	95,459		FULLY USED	AD 64 499

OCT - DEC, 1990 COMMODITY UTILIZATION  
(MOTOR CYCLES)

LOCATION	QUANTITY
AG DEPT/LAHORE	23
AG DEPT/HYDERABAD	20
AG DEPT/QUETTA	0
AG DEPT/PESHAWAR	6
FBS/ISLAMABAD	1
<b>Total</b>	<b>50</b>

OCT - DEC, 1990 COMMODITY UTILIZATION  
(COMPUTERS)

EQUIPMENT	QUANTITY	USER	LOCATION	USAGE
PC-AT & MONITOR PRINTER	6 6	STATISTICS DIVISION	ISLAMABAD	FULLY USED
PC-AT & MONITOR PRINTER	12 12	ADC/FBS	ISLAMABAD	FULLY USED
PC-AT & MONITOR PRINTER	2 2	AG DEPT	HYDRABAD	FULLY USED
PC-AT & MONITOR PRINTER	3 3	AG DEPT	PEGHAWAR	FULLY USED
PC-AT & MONITOR PRINTER	2 2	AG DEPT	QURTTA	FULLY USED
PC-AT & MONITOR PRINTER	4 4	FBS	KARACHI	FULLY USED
PC-AT & MONITOR PRINTER	12 12	PISTAR	LAHORE	FULLY USED
PC-AT & MONITOR PRINTER	3 3	CRS	LAHORE	FULLY USED
HP VECTRA QS-16S/PC & MONITOR	2	ADC/FBS	ISLAMABAD	FULLY USED
PRINTERS	2	ADC/FBS	ISLAMABAD	FULLY USED

TOTAL COMPUTER SYSTEMS : 46

TOTAL MONITORS: COLOR : 22  
MONOCHROME: 24

TOTAL PRINTERS : 46

OCT - DEC 1990 COMMODITY UTILIZATION  
(PRINTING PRESSES)

EQUIPMENT	QUANTITY	DISTRIBUTION	LOCATION	USAGE
SOLNA OFFSET PRINTING PRESS	1	1	FBS/KARACHI	FULLY USED
DAVIDSON PRESS MODEL 901	2	1 1	PUNJAB SINDH	INSTALLED 1/
AGFA REPROMASTER 2100 CAMBRA	3	1 1 1	FBS/KARACHI PUNJAB SINDH	FULLY USED INSTALLED 1/
MICROPROCESSOR PAPER CUTTER	2	1 1	PUNJAB FBS/KARACHI	INSTALLED FULLY USED
NUARC EXPOSURE UNIT	3	1 1 1	FBS/KARACHI PUNJAB SINDH	FULLY USED INSTALLED 1/
INTERLAKE STITCHER	2	1 1	PUNJAB SINDH	INSTALLED 1/

1/ In process of installation.

Appendix 4  
(Continued)

OCT - DEC, 1990 COMMODITY UTILIZATION  
(OFFICE, LAB & FIELD EQUIPMENT)

EQUIPMENT	QUANTITY	USER	LOCATION	USAGE
DIGITIZER - ALTEK	4	FBS	ISLAMABAD	FULLY USED
ZOOM - TRANSFERSCOPES	2	FBS	ISLAMABAD	FULLY USED
IBM TYPEWRITERS	1	FBS	ISLAMABAD	FULLY USED
	1	PISTAR	LAHORE	FULLY USED
BINDING MACHINE	1	PISTAR	LAHORE	FULLY USED
AUDIO-VIDEO EQUIP				
T.V. 26" NATIONAL (COLOR)	1	PISTAR	LAHORE	FULLY USED
V.C.R. MODEL L-15	1	PISTAR	LAHORE	FULLY USED
DISPLAY SCREEN	3	PISTAR	LAHORE	FULLY USED
OVER-HEAD PROJECTORS	2	PISTAR	LAHORE	FULLY USED
SLIDE PROJECTOR	1	PISTAR	LAHORE	FULLY USED
PORTABLE WHEAT THRESHERS	4	ADC PUNJAB	LAHORE	NOT IN USE
WHEAT THRESHERS	1	ADC LAB	ISLAMABAD	FULLY USED
OVEN	4	ADC LAB	ISLAMABAD	FULLY USED
WEIGHING SCALES	2	ADC LAB	ISLAMABAD	FULLY USED
AIR CONDITIONERS	8	FBS		FULLY USED
	1	NWFP		FULLY USED
	1	BALUCHISTAN		FULLY USED
	1	LAHORE		FULLY USED
	1	HYDERABAD		FULLY USED

## ADC FINANCIAL STATEMENT

BUDGET ELEMENT	Budget Jul90-Jun91	Jul-Sep 1990	Oct-Dec 1990	Jan-Mar 1991	Apr-Jun 1991	Cumulative	Percent of Budget
<b>TECHNICAL ASSISTANCE</b>							
Long term	127,271	35,900	34,983			70,883	
Short Term	100,328	0	0			0	
Commodities	10,000	2,400	5,900			8,300	
Washington Backstop	86,589	5,900	5,817			11,717	
Others	2,925	0	0			0	
SUB-TOTAL	327,113	44,200	46,700			90,900	13.5%
<b>FEDERAL BUREAU OF STATISTICS</b>							
Pay of Officers & Staff			10,328			10,328	
Supplies			16,106			16,106	
Maintenance			1,094			1,094	
Postal & Telephone			7			7	
Other			40			40	
SUB-TOTAL	137,868	0 1/	27,574			27,574	20.0%
<b>PROVINCIAL GOVERNMENTS</b>							
Pay of Officers & Staff			27,326			27,326	
Supplies			4,308			4,308	
Maintenance			2,617			2,617	
Postal and Telephone			683			683	
Other			1,760			1,760	
SUB-TOTAL	183,824	0 1/	36,765			36,765	20.0%
<b>LOGISTIC SUPPORT SERVICES</b>							
ADC office staff	80,000	18,535	21,691			40,226	
Office Supplies and Equipment	10,000	399	1,447			1,846	
Vehicle Repair, Maintenance	5,000	982	464			1,448	
Computer Software and Maint.	5,000	0	70			70	
Other Miscellaneous	76,584	31,047	8,080			39,127	
SUB-TOTAL	178,584	50,963	31,752			82,715	46.8%
<b>GRAND TOTAL</b>	<b>825,368</b>	<b>95,163</b>	<b>142,790</b>			<b>237,953</b>	<b>28.8%</b>

All values include appropriate overhead

Figures are preliminary

1/ Data not available as of Oct. 22, 1990

## AGRICULTURAL DATA COLLECTION PROJECT - LONG TERM CONSULTANTS

Name	Arrival	Departure	Person Days	Person Months	Category
T. J. Byram	28-08-86	28-08-88	731	24	Team Leader
G. Eric Waldhaus	10-02-86	25-10-89	1353	45	Survey Statistician
Dwaine Nelson	23-07-88	30-06-90	707	24	Team Leader
Robert L. Addison	18-06-90				Team Leader

## AGRICULTURAL DATA COLLECTION PROJECT - SHORT TERM CONSULTANTS 1/ 2/

NAME	Arrived	Departed	Person Days	Category	Subject	Per Day (Days/30) \$ 4500	Travel	Salary (Days/30) \$ 8200	Trip cost in US \$	Exchange Rate	Trip cost in Rupees	Number of Man Months	US\$10 BUDGET	% OF USAID BUDGET
Larry A. Sivers	20-Jul-85	01-Aug-85	13	Initiate Project		1950	4000	3553	9503	15.90	151,103	0.43		
Ocell Larson	20-Jul-85	01-Aug-85	13	Initiate Project		1950	4000	3553	9503	15.90	151,103	0.43		
T. J. Byrue	20-Jul-85	01-Aug-85	13	Initiate Project		1950	4000	3553	9503	15.90	151,103	0.43		
Charles H. Cook	01-Nov-85	10-Nov-85	10	Administrative-DICD	PASA Funding Mechanism	1500	4000	2733	8232	15.90	133,910	0.35		
G. Eric Waldhaus	04-Nov-85	19-Nov-85	16	Training	ASF Construction	2400	4000	4373	10773	15.90	171,296	0.53		
Larry A. Sivers	04-Nov-85	12-Dec-85	39	Training	ASF Construction	5550	4000	10660	20510	15.90	326,109	1.30		
Josephine S. Wallace	11-Nov-85	15-Dec-85	34	Training	ASF Construction	5100	4000	9253	18393	15.90	292,454	1.13		
Roger D. Lathas	16-Jan-86	30-Jan-86	14	Consulting	Assembling Microcomputers	2100	4000	3527	9927	14.50	163,790	0.47		
Josephine S. Wallace	17-Mar-86	07-Apr-86	21	Training	ASF Construction	3150	4000	5740	12890	14.50	212,695	0.70		
Krista S. Oswald	06-Apr-86	24-Apr-86	18	Training	Intro. Microcomputer Workshop	2700	4000	4920	11620	14.50	191,730	0.60		
FY 85-86 TOTAL			191			28650	40000	52207	\$129,857		1,942,283	6.37	\$176,980	65.29%
Frédrick D. Baker	12-Jun-86	15-Jul-86	33	Training	Statistics Short Course	4950	4000	9020	17970	16.50	296,505	1.20		
Charles R. Perry	15-Jun-86	12-Jul-86	27	Training	Statistics Short Course	4050	4000	7320	15430	16.50	254,595	0.90		
Bill Kelly	23-Jun-86	03-Jul-86	10	Administrative-DICD	AID/ADC/DICD Business	1500	4000	2733	8233	16.50	135,950	0.33		
Ronald Fesco	23-Jun-86	04-Jul-86	11	Training	Statistics Short Course	1650	4000	3007	8657	16.50	142,835	0.37		
Jewell T. Barr	14-Sep-86	01-Oct-86	17	Training	Mainframe SAS	2550	4000	4647	11157	16.50	194,745	0.57		
James E. Stepanich	15-Sep-86	01-Oct-86	16	Training	Mainframe SAS	2400	4000	4373	10773	16.50	177,760	0.53		
Ronald A. Sadler	08-Jan-87	26-Jan-87	18	Training	Intro. Microcomputer Workshop	2700	4000	4920	11620	17.30	201,024	0.60		
Mark Harris	19-Jan-87	01-Feb-87	13	Sampling	Select ASF Sample	1950	4000	3553	9503	17.30	154,408	0.43		
Charles R. Perry	31-Jan-87	04-Mar-87	32	Training	Statistics Short Course	4800	4000	8747	17547	17.30	303,557	1.07		
Paul Blackwood	31-Jan-87	04-Mar-87	32	Training	Statistics Short Course	4800	4000	8747	17547	17.30	303,557	1.07		
Carroll Rock	23-Mar-87	30-Apr-87	38	Consulting	Ag. Prices Study	5700	4500	10387	20687	17.30	347,499	1.27		
James E. Stepanich	26-Mar-87	19-Apr-87	23	Training	PC SAS	3450	4000	6287	13737	17.30	237,644	0.77		
Larry A. Sivers	01-Jun-87	09-Jun-87	8	Administrative-NASS	Support for Resident Advisors	1200	4000	2157	7357	17.30	127,789	0.27		
Falcon Otto	01-Jun-87	09-Jun-87	8	Administrative-DICD	AID/ADC/DICD Business	1200	4000	2157	7357	17.30	127,789	0.27		
FY 86-87 TOTAL			236			42900	56000	78173	\$177,073		3,005,561	9.53	\$187,828	164.22%
Jewell T. Barr	14-Sep-87	29-Sep-87	15	Consulting	ACD Methodology Review	2250	4000	4105	10350	17.30	179,055	0.50		
Mark Harris	14-Sep-87	07-Oct-87	23	Consulting	ACD Methodology Review	3450	4000	6287	13737	17.30	237,644	0.77		
Montie Wallace	14-Sep-87	09-Oct-87	24	Consulting	ACD Methodology Review	3600	4000	6560	14150	17.30	244,968	0.80		
Richard Allen	14-Sep-87	02-Oct-87	18	Consulting	ACC Methodology Review	2700	4000	4920	11620	17.30	201,024	0.60		
James E. Stepanich	17-Sep-87	05-Oct-87	21	Consulting	Computer programming for ADC	3150	4000	5740	12890	17.30	222,997	0.70		
Bob Kale	28-Sep-87	16-Oct-87	18	Consulting	ACC Methodology Review	2700	4000	4920	11620	17.30	201,024	0.60		
David Pawel	28-Sep-87	16-Oct-87	19	Consulting	ACD Methodology Review	2700	4000	4920	11620	17.30	201,024	0.60		
Robert Rovinski	09-Nov-87	22-Nov-87	13	Consulting	Computer Mod. and Exp. Study	1950	4000	3553	9503	17.30	164,408	0.43		
Dwayne Nelson	01-Feb-88	27-Feb-88	26	Consulting	St. Crop Estimates Improvement	3900	4000	7107	15007	18.00	270,120	0.87		
Paul Blackwood	11-Feb-88	17-Mar-88	35	Training	Statistics Short Course	5250	4000	9547	19917	18.00	328,700	1.17		
Charles R. Perry	13-Feb-88	12-Mar-88	32	Training	Statistics Short Course	4800	4000	8747	17547	18.00	315,840	1.07		
James E. Stepanich	31-Mar-88	21-Apr-88	23	Training	PC SAS	3450	4000	6287	13737	18.00	247,249	0.77		
FY 87-88 TOTAL			266			39000	48000	72707	\$160,687		2,524,070	8.57	\$221,436	72.51%

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AGRICULTURAL DATA COLLECTION PROJECT - SHORT TERM CONSULTANTS 1/ 2/

Appendix 6  
(Continued)

NAME	Arrived	Departed	Person Days	Category	Subject	Per Diem (Days/30) * 4500	Travel	Salary Trip cost (Days/30) * 8200	Exchange Rate	Trip cost in Rupees	Number of Man months	USAID BUDGET	% OF USAID BUDGET
Hark Harris	30-Oct-88	07-Nov-88	8	Consulting	ACC Methodology Review	1200	4000	2187	7357	18.00	132,960	0.27	
Paul Blackwood	30-Oct-88	19-Nov-88	20	Training	Primary Data Collection Methods	3000	4000	5467	12467	18.00	224,400	0.67	
Theresa Holland	30-Oct-88	19-Nov-88	20	Training	Primary Data Collection Methods	3000	4000	5467	12467	18.00	224,400	0.67	
Benjamin F. Klugh, Jr.	07-Jan-89	26-Jan-89	19	Training	Primary Data Collection Methods	2850	4000	5193	12043	19.50	234,845	0.63	
Paul K. Cook	07-Jan-89	26-Jan-89	19	Training	Primary Data Collection Methods	2850	4000	5193	12043	19.50	234,845	0.63	
Larry A. Sivers	30-Jan-89	13-Feb-89	14	Administrative-NASS	Support for Resident Advisors	2100	4000	3527	9927	21.08	209,254	0.47	
James Mark Harris	12-May-89	26-May-89	14	Training	Digitization	2100	4000	3527	9927	21.08	209,254	0.47	
Martin Oza	12-May-89	26-May-89	14	Training	Digitization	2100	4000	3527	9927	21.08	209,254	0.47	
<b>FY 88-89 TOTAL</b>			<b>128</b>			<b>19200</b>	<b>32000</b>	<b>34957</b>	<b>\$86,187</b>		<b>1,663,528</b>	<b>4.27</b>	<b>\$224,955 36.68%</b>
Larry A. Sivers	30-Jul-89	19-Aug-89	20	Administrative-NASS	Prel. Work for New Agreement	3333	4500	5467	13300	21.08	280,364	0.67	
T. J. Byram	30-Jul-89	19-Aug-89	20	Administrative-NASS	Prel. Work for New Agreement	3333	4500	5467	13300	21.08	280,364	0.67	
Larry A. Sivers	03-Nov-89	24-Nov-89	21	Administrative-NASS	Prel. Work for New Agreement	3500	4500	5740	13740	21.28	292,387	0.70	
James Mark Harris	13-Nov-89	06-Dec-89	25	Training	SPDT Stratification Training	4167	4500	6833	15500	21.31	330,305	0.83	
Robert L. Addison	27-Nov-89	15-Dec-89	18	Consulting	Objective Yield Review	3000	4500	4920	12420	21.31	254,670	0.60	
James Mark Harris	19-Jan-90	07-Feb-90	19	Training	SPDT Stratification Training	3167	4500	5193	12560	21.40	275,204	0.63	
Robert L. Addison	09-Mar-90	28-Mar-90	19	Consulting	Wheat Obj Yield Research	3167	4500	5193	12560	21.40	275,204	0.63	
Steve Kellogg	09-Mar-90	30-Mar-90	21	Training	Primary Data Collection Methods	3500	4500	5740	13740	21.40	294,036	0.70	
Gary Keough	09-Mar-90	28-Mar-90	19	Training	Primary Data Collection Methods	3167	4500	5193	12560	21.40	275,204	0.63	
Martin Oza	14-Mar-90	29-Mar-90	13	Training	Digitization	2167	4500	3553	10220	21.40	215,708	0.43	
Tom Birkett	11-Jun-90	22-Jun-90	11	Consulting	Wheat Obj Yield Research	1833	4500	3007	9340	21.85	204,079	0.37	
<b>FY 89-90 TOTAL</b>			<b>206</b>			<b>34333</b>	<b>49500</b>	<b>56307</b>	<b>\$140,140</b>		<b>2,990,525</b>	<b>6.87</b>	<b>\$60,000 233.57%</b>
				83	Administrative-NASS								
				28	Administrative-OICD								
				294	Consulting								
				39	Initiate Project								
				13	Sampling								
				630	Training								
			<b>TOTAL PERSON DAYS</b>	<b>1077</b>									
			<b>TOTAL PERSON MONTHS</b>	<b>35.90</b>									

1/ Person Days: Includes arrival date but not departure date.  
2/ US Government overhead is included in all cost estimates.